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09/874,670	06/05/2001	Shunpei Yamazaki	SEL-156 DIV	6756

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EXAMINER

MALSAWMA, LALRINFAMKIM HMAR

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/874,670	Applicant(s) YAMAZAKI ET AL.	
	Examiner Lex Malsawma	Art Unit 2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22,23,28,29,34,35,40-49,58 and 59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22,23,28,29,34,35,40-49,58 and 59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/477,965.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>01292004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Prosecution Reopened

1. The indicated allowability of claims 50-53, in the prior Office Action made FINAL, is withdrawn in view of the newly discovered reference(s) to Murade (U.S. Pat. No. 6,330,044 B1).

Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 46-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 46-49 are indefinite because each of the claims they depend from (i.e., claims 22, 23, 28, and 29) requires the light shielding conductive layer to be electrically connected to a fixed potential; therefore, it is not clear how the light-shielding layer can be floating while being electrically connected to a fixed potential.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 22, 34, 42, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon (5,942,310) in view Murade (6,330,044 B1).

Regarding Claims 22 and 42:

Moon discloses (in Figs. 2A-2E) a semiconductor device comprising:

a substrate 100;

at least one pixel electrode 11 formed over said substrate;

at least one TFT formed over said substrate for switching said pixel electrode, said TFT comprising:

a semiconductor layer (1, 2) having at least source, drain, and channel regions and a capacitor forming portion;

a first insulating film 5 formed on said channel region; and

a gate electrode 3 formed over said channel region with said first insulating film 5 interposed therebetween;

a storage capacitor electrically connected to said TFT, said storage capacitor comprising:
said capacitor forming portion 2 of the semiconductor layer (1, 2);
a capacitor forming electrode 4 formed over said capacitor forming portion; and
a second insulating film 6 interposed between said capacitor forming portion and said capacitor forming electrode, wherein said second insulating film 6 is thicker than said first insulating film 5.

Moon **lacks** a light shielding conductive layer formed over said substrate and electrically connected to a fixed potential, wherein said light shielding film is located below the semiconductor layer. Murade **teaches** (in Fig. 5; Col. 2, lines 33-34, 43-65; Col. 5, lines 5-8; and Col. 10, lines 38-40) that prior art problems associated with leakage current can be prevented by utilizing a light shielding conductive layer 7, which is electrically connected to a fixed potential, wherein the light-shielding layer 7 is located “under” the semiconductor/active layer (1a-1e). In summary, Moon discloses the general inventive aspect of a device comprising a TFT and a capacitor structure, wherein the TFT has an insulating film that is thicker than the insulating film of the capacitor structure; Murade teaches it was very well known in the art to incorporate a light shielding layer such that problems associated with leakage current can be prevented by forming the light-shielding layer “under” the semiconductor/active layer; therefore, it would have been obvious to one of ordinary skill in the art to modify Moon by incorporating a light-shielding layer (as taught by Murade) because the light shielding layer would effectively eliminate leakage current such that device performance would significantly improve. *Specifically regarding claim*

42: Murade discloses materials similar to those of the currently claimed invention (see Col. 5, lines 5-9).

Regarding Claim 34:

Moon (in view of Murade) discloses the claimed invention except for the specific ranges in thickness for the first and second insulating films. However, note that Murade discloses thickness ranges typically ranging from 20 to 150 nm (Col. 24, lines 18-28); and Moon does not specify any particular range in thickness for either the first or second insulating layer; therefore, one of ordinary skill in the art would have incorporated thickness ranges according to design needs. It would have been obvious to one of ordinary skill in the art to specify thickness ranges as currently claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding Claim 58:

It would have been obvious to one of ordinary skill in the art to incorporate the semiconductor device of Moon (in view of Murade) into an electronic device selected from the list recited in the instant claim because it was common in the art to incorporate a LCD device (similar to that disclosed Moon and Murade) into such electronic devices.

7. Claims 23, 35, 43, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon (5,942,310) in view Murade (6,330,044 B1) and Sato (5,818,552).

Regarding Claims 23 and 43:

Moon discloses (in Figs. 2A-2E) a semiconductor device comprising:

a substrate 100;

a semiconductor layer (1, 2) formed over said substrate, said semiconductor layer having at least a pair of impurity regions and a channel region extending therebetween and a capacitor forming portion 2 (NOTE: active semiconductor region "1" will include a pair of impurity regions and a channel region therebetween);

a "second" insulating film 5 formed on said channel region;

a "third" insulating film 6 formed on said capacitor forming portion 2 of the semiconductor layer;

a gate electrode 3 formed over said channel region;

a capacitor forming electrode 4 formed over said capacitor forming portion 2 with said "third" insulating film 6 to form a storage capacitor, wherein said "second" insulating film 5 is thicker than said "third" insulating film 6;

a "fourth" insulating film 7 formed over said storage capacitor and said gate electrode;

an electrode (8, 9) formed on said "fourth" insulating film 7;

a "fifth" insulating film 10 formed over said "fourth" insulating film 7 and said electrode;
and

a pixel electrode formed on said fifth insulating film and electrically connected to one of said pair of impurity regions.

Moon **lacks** the following limitations: (1) a light shielding conductive layer over the substrate and electrically connected to a fixed potential; (2) a first insulating layer formed on said light shielding conductive layer; (3) a black mask formed on the "fifth" insulating film; and (4) a "sixth" insulating layer formed over the "fifth" insulating film and the black mask; however, it is

important to note that Moon does not disclose a complete device. In regards to items “(1)” and “(2)”, Murade **teaches** (in Fig. 5) it was very well known in the art to utilize a light-shielding layer 7 and an insulating layer 11 located below the semiconductor layer, wherein the light-shielding layer is electrically connected to a fixed potential (see above, *Regarding Claim 22*). In regards to items “(3)” and “(4)”, Sato discloses it was very well known in the art to incorporate a black matrix (i.e., a black mask) into an active matrix liquid crystal display device (AMLCD), i.e., into a device similar to that disclosed by Moon, and it was well known in the art to locate a black mask on a counter substrate or on a driving substrate (note Col. 1, lines 56-66). Sato **teaches** (in figure 1A) a device having a black mask (16M, 16P) on a driving substrate, wherein incorporating the black mask requires the following: an insulating layer 17 formed over a previously formed insulating layer 15 and over electrodes 11, 12; the black mask (16M, 16P) being formed on insulating layer 17; another insulating layer 18 formed over the black mask and the insulating layer “17”; and a pixel electrode 6 formed on the insulating layer “18”. Note Sato discloses alignment precision between a pixel electrode and a black mask can be realized by incorporating the black mask into the driving substrate (note col. 1, lines 62-64). It would have been obvious to one of ordinary skill in the art to modify Moon by incorporating a light shielding layer (as taught/shown by Murade) and a black mask (as taught/shown by Sato) because Murade teaches that a light-shielding layer that is located under the semiconductor layer (and electrically connected to a fixed potential) will prevent leakage current from adversely affecting the device; and Sato teaches it was also well known in the art to utilize a black mask in a LCD device for shielding light (note Sato, Col. 1, lines 10-14), wherein forming a black mask as taught by Sato allows precise alignment between a pixel electrode and the black mask. *Specifically regarding*

claim 43: Murade discloses materials similar to those of the currently claimed invention (see Col. 5, lines 5-9).

Regarding Claims 35 and 59:

These claims are similar to Claims 34 and 58 (addressed in detail above), therefore, they are held obvious over the cited references with reasoning similar to those applied to Claims 34 and 58.

8. Claims 28, 40, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon (5,942,310) in view of Murade (6,330,044 B1) and Misawa (5,341,012).

Regarding Claim 28 and 44:

These claims are essentially the same as Claims 22 and 42 with the exception being that they are drawn to a projector having the additional limitations of a light source. It is noted that Moon (in view of Murade) discloses all limitations of the liquid crystal panel (see above *Regarding Claims 22 and 42*). Misawa is **cited only** to show it was very well known in the art that a projector would include a light source in combination with an active matrix panel (i.e., a liquid crystal panel, note Fig. 18 and col. 16, lines 11-45). It would have been obvious to one of ordinary skill in the art to incorporate the semiconductor device of Moon (in view of Murade) into a projector having a light source because Misawa shows it was very well known in the art to make such an incorporation.

Regarding Claims 40:

This claim is similar to Claim 34 (addressed in detail above), therefore, it is held obvious over the cited references with reasoning similar to that applied to Claims 34.

9. Claims 29, 41, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon (5,942,310) in view of Murade (6,330,044 B1), Sato (5,818,552), and Misawa (5,341,012).

Regarding Claims 29 and 45:

These claims are essentially the same as Claims 23 and 43 with the exception being that the instant claim is drawn to a projector having the additional limitations of a light source. It is noted that Moon (in view of Murade and Sato) discloses all limitations of the liquid crystal panel (see above *Regarding Claims 23 and 43*). Misawa is **cited only** to show it was very well known in the art that a projector would include a light source in combination with an active matrix panel (i.e., a liquid crystal panel, note Fig. 18 and col. 16, lines 11-45). It would have been obvious to one of ordinary skill in the art to incorporate the semiconductor device of Moon (in view of Sato and Murade) into a projector having a light source because Misawa shows it was very well known in the art to make such an incorporation.

Regarding Claims 41:

This claim is similar to Claims 34 (addressed in detail above), therefore, it is held obvious over the cited references with reasoning similar to that applied to Claims 34.

Status of the Claims

10. Claims 22, 23, 28, 29, 34, 35, 40-49, 58, and 59 are pending.
11. Claims 22, 23, 28, 29, 34, 35, 40-49, 58, and 59 are rejected.

Remarks

12. The amendments after FINAL have been entered and all pending claims have been reconsidered. The amendments to independent claims 22, 23, 28, and 29 renders claims 46-49 indefinite. In light of the new reference(s) cited, the previously indicated allowability of subject matter incorporated into claims 22, 23, 28, and 29 by amendment has been withdrawn; and new grounds of rejections have been introduced in this Office Action. Accordingly, prosecution has been reopened and this Office Action is made NON-FINAL.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sakamoto et al. (US 6,069,678) is cited to show it was well known in the art to utilize a light-shielding layer "underneath" a TFT, wherein the light-shielding layer 701 is kept in an electrically floating state (note Fig. 7 and Col. 4, lines 19-21).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lex Malsawma whose telephone number is 571-272-1903. The examiner can normally be reached on Monday through Thursday (8 AM - 6 PM EST).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2825

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lex Malsawma

February 21, 2004


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